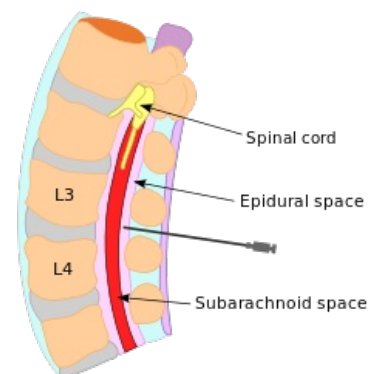


# Epidural anesthesia in obstetrics

**Epidural anesthesia** was first used in births at the turn of the 19th and 20th centuries.

## Execution

- We will provide venous access for the administration of pharmaceuticals in the event of a drop pressure;
- if we want to tear the sac of membranes, we wait **after anesthesia**;
- prepare an infusion with oxytocin;
- the mother sits on the edge of the bed with her legs hanging down. Her head is pressed to her chest, her back is rounded and her shoulders are as low as possible – the **fetus position** or the so-called **cat's back** (some authors recommend the side position in case of hypotension);
- **we disinfect the field** - we disinfect the whole back in circles, in the center is the approximate area of vertebrae L3-L5 (the spinal cord ends at L1, maximum L2);
- we usually choose the **L3-L4** space for injection (but L2-L3 or L4-L5 is also possible);
- **local numb** the skin (e.g. lidocaine - Xylocain® 1%);
- we will wait for the injections until the woman does not have a contraction;
- we aim to reach the epidural space. We will feel a **sudden change in resistance** (*loss of resistance*), we advance the needle between the vertebrae (someone describes this as a **peel**) - the *loss of resistance* or a *hanging drop* method is used to identify the epidural space;
- then a **catheter is inserted**, which is equipped with an **antibacterial filter** at the free end, and a test dose is administered, e.g. 2.5 ml of 0.5% Bupivacaine, to verify that we have not inserted the catheter subarachnoidally;
- if this test is negative, we connect the filter with a tube to a perfusor with a **syringe with a drug**;
- in addition, we have prepared a syringe with **ephedrine** (3 mg) or catecholamine, in case of a large drop in pressure → we check the pressure every 3 minutes during 20 minutes;
- it is necessary to remember that:
  - the mother has a problem with taking a suitable position because of her belly;
  - due to contractions, she may also have trouble keeping still during the injection → anesthesia should be performed by experienced anesthesiologists in these cases.



Epidural space

## Effect

- **On the nerves:**
  - anesthetic agent **changes the transmembrane polarity of neurons** - poorly myelinated or thin nerves are blocked first: *neurovegetative* → *sensitive* → *motor* finally;
  - the effect on CNS is minimal and has no clinical significance.
- **On the hormonal levels:**
  - by blocking the vegetative nerves (sympathetic) there will be a **rapid decrease** in the production of endogenous **adrenaline**, which can result in **hypertonia of the uterus** ;
    - adrenaline is low in the first phase of labor → higher concentration inhibits labor = contraction;
    - during the 2nd stage of labor, adrenaline rises and helps the expulsion of the fetus;
  - **oxytocin does not rise** under epidural anesthesia by physiological standards, so it is often necessary to deliver it by infusion.
- **On the cardiovascular system:**
  - by acting on the vegetative nerves, a **vasodilatation** occurs, which in an extreme case can lead to a **maternal collapse** and a **fetal distress** due to a lack of blood supply to the placenta - we prevent this complication by giving an infusion;
  - some authors recommend injecting epidural anesthesia in the side position with monitoring of the cardiogram and pressure of the mother.
- **On the womb:**
  - slightly **reduces the intensity of contractions**;
  - it is not uncommon to notice the disappearance of contractions within 10 minutes after the administration of the drug, but they reappear, they are a normal part of childbirth.
- **Other:**



Catheter with Tuohy needle



Introduced epidural anesthesia

- may be **increased intestinal peristalsis** (postpartum or post-operative beneficial).

## Benefits

- The only method ensuring **anesthesia** up to the full extent **without alteration of consciousness** of the mother;
- if necessary, it is possible to quickly increase the dose and **carry out a caesarean section**;
- the drug **does not pass** for the most part **into the child's blood** (approx. up to 10% - according to the drug);
- **comfort** of the mother and the staff;
- during an exhausting or painful birth (or a stressed woman), anesthesia will help to relax and better complete the birth.

## Disadvantages

- They were mainly based on the older dosage, which resulted in large **pressure drops** (collapse and distress of the fetus);
- a higher percentage of the end of childbirth by instrumental or caesarean section;
- nowadays these main disadvantages have been minimized (not disappeared).

## Other side effects

- If the dose is wrongly estimated, the feeling of **heavy legs** up to the impossibility of moving them (normally it resolves within 3 hours);
- **inability to urinate**;
- if the dose is wrongly estimated, the anesthesia may be **longer** (even 12 hours) or **insufficient** (he feels pain).

*Note: Oxytocin sets maternal behavior in the brain (according to studies in mammals). Due to the lower levels of oxytocin in the brain under epidural anesthesia, disruption of the mother-child relationship is possible. To what extent and of what severity is such a breach*

## Indication

- The main indication is **the mother's wish**;
- depending on the hospital, however, the approach to when anesthesia can be given differs (the norm is from 3 to 5 cm of throat opening, according to some recommendations, the woman's wishes are more important);
- early administration can even stop labor;
- late delivery (around 8-9 cm), due to the necessary preparation and the delay between delivery and effect, is unnecessary;
- however, it is up to the staff to decide (even with 8 cm labor can take another 3 hours);
- in many countries the **wish of the woman** decides;
- in addition, epidural anesthesia has a number of **medical indications**:
  - these are conditions where it is necessary to prevent physiological reactions during childbirth: pain → adrenaline → strain → physical exertion (e.g. asthma, diabetes, preeclampsia, heavy smokers);
  - or births where an instrumental termination is more likely (birth of twins - cephalic, breech).

## Contraindications

- **Absolute contraindications**:
  - number of platelets  $< 75 \times 10^9 / l$ ;
  - bleeding time  $> 10$  minutes;
  - Quick's time  $< 50$ ;
  - aPTT  $> 42$  s;
  - acute fetal distress;
  - (mother's disapproval).
- **Furthermore** epidural anesthesia is contraindicated in:
  - "urgent" conditions;
  - severe "hypovolemia" etc.

## Relative contraindications

- **Anticoagulation treatment** - acetylsalicylate in the last 3 days, low molecular weight heparin in high doses (danger of compressive hematoma);
- **disorders coagulation**;
  - blood clotting and blood count tests must be performed before delivery;
  - if the mother-to-be does not have these tests, they are done on the spot and wait for the result with the administration of anesthesia;
- **skin infection** at the potential injection site;
- **sepsis**;
- **neurological pathologies** of the mother (e.g. spina bifida occulta) – however, many pathologies are not

affected by anesthesia (however, e.g. with multiple sclerosis we prefer to explain everything to the mother and have her sign the informed consent);

- **interventions on the spine** in the lumbar region.

## Complications

- They are rare;
- 3 basic mechanisms happen:

1. *direct damage* to structures during injection and application;
2. *epidural hematoma*;
3. *epidural abscess*.

← neurological symptomatology, lumbar spine pain – IRM – urgent surgical decompression

- Species:
  - **Catheter Rupture:**
    - may not be visible;
    - mostly without serious complications.
  - **Back pain:**
    - debatable – postpartum back pain is described by 10% of women who gave birth without epidural anesthesia;
    - *epidural anesthesia continuity study* - pain is significantly different, the psychological factor plays a big role.
  - **Headaches** from damage (perforation) of the dura:
    - lasts 2-8 hours (rarely even two weeks);
    - the only effective treatment: **blood patch** = injection of one's own blood into the epidural space (occasionally necessary to repeat); rarely has consequences such as permanent headache or vestibulo-cochlear problems (may last for years).
  - **Infection:**
    - 0.8-3.7% (superficial, deep) ← mostly *Staphylococcus aureus*, *Pseudomonas aeruginosa*.
  - **Cardio-respiratory arrest;**
    - from a serious error by the anesthesiologist (after injecting a large volume of substance at once into the liquid).
  - **Birth Complications:**
    - transient fetal *heart rhythm changes*;
    - rarely serious *decelerations* (2%);
    - are most common in the next hour after anesthesia administration;
    - we primarily change the position of the mother (on her side) and put on an oxygen mask;
    - may be the result of uterine hypertension (we stop the administration of oxytocin) or maternal hypotension (more fluids and possibly ephedrine).
  - **Extending labor:**
    - with today's doses and practice, the extension of the first period is rather exceptional;
    - however, the second period of labor can be prolonged, especially in the case of an uncooperative mother who does not feel anything despite the anesthesia (therefore it is advisable that she at least feels the pressures).
  - **Abnormal rotation of the fetal head.**

## What you need to take into consideration

- Before giving birth (approx. 8th month), a **consultation with an anesthesiologist** is appropriate - *blood count, coagulation, information, check of contraindications*;
- in the hall it is necessary to **check contraindications** again, **establish an intravenous catheter and infusion**;
- the mother does not feel the urge to urinate → regularly **vacuate**;
- the position on the back is extremely inappropriate (however, the mother does not mind subjectively, because she does not feel anything) → **position** on her side, in a sitting position;
- anesthesia can cause a **sharp drop in pressure** = be prepared (preventive infusion and ephedrine on hand).

## Pharmacology

- Doses for vaginal delivery:
  - **Bupivacaine:** 0.125% - 0.25% (eg Marcaine®, Bupivacaine®) - gold standard:
    - benefits:
      - duration up to 90 minutes;
      - transplacental transition up to 5%;
      - middle motor block.
    - disadvantages:
      - onset of effect approx. 15 minutes;
      - with accidental intravascular application is cardiotoxic → leads to atrial fibrillation resistant to classical treatment.
  - **Ropivacaine** (Naropin®):
    - advantage over bupivacaine: weaker motor block – more comfort for the mother, less cardiotoxicity.

- **Lidocaine:**
  - transplacental transfer under 10%, old research showed up to 30%;
  - large motor block – more suitable for instrumental delivery or caesarean section.
- It is also added to the following local anesthetics:
  - **adrenaline** - prolongs the duration of the anesthetic effect and reduces its vascular resorption.
  - **Opiates:**
    - shorten the delay between the administration and the effect of the anesthetic;
    - reduce the total dose of local anesthetic;
    - the most used are *fentanyl* and *sufentanyl* (large transplacental transfer) - however, they do not have a significant effect on the fetus in epidural anesthesia;
    - can, however, cause respiratory distress in the mother, increase urine retention, cause nausea or vomiting.

## Dose individualization

- We work with the subjective perception of the woman - appropriately adjusted according to the mother; the so-called **PCEA** (Patient controlled epidural anesthesia) was introduced somewhere.
- Depending on the course of labor, the dosage can be changed:
  - less for the beginning of the first stage of labor;
  - more for the second part of the first period;
  - reduce again for the second time of labor, so that the woman feels the contractions a little and can push well.

← However, this does not happen very often in practice

## What to tell mothers about epidural anesthesia

- It does not significantly change the course of childbirth and does not endanger the child either;
- will reduce pain, but does not guarantee a painless birth;
- administration may cause a drop in pressure to which personnel are prepared to respond;
- further, I would write down all the main points in a layman's form and have the mother sign;
- conclusion of the speech: *Generally speaking, the benefit outweighs the weak risks and side effects.* 3 cm *painful*. In case of contraindications and failure to perform anesthesia, unpreparedness is a big problem.)

## Links

### Related Articles

- Anesthesia (signpost)

### References

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*For more information about epidural anesthesia on the Wikiscript pages, see here.*